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EDITED BY

E. J. POPHAM, D.Sc., Ph.D., A.R.C.S., F.R.E.S.

WITH THE ASSISTANCE OF

W. A. F. BALFOUR-BROWNE, M.A., F.R.S.E., F.L.S., F.Z.S., F.R.E.S., F.S.B.E.

W. D. HINCKS, D.Sc., F.R.E.S.

B. M. HOBBY, M.A., D.PHIL., F.R.E.S.

G. J. KERRICH, M.A., F.L.S., F.R.E.S.

O. W. RICHARDS, M.A., D.Sc., F.R.E.S., F.S.B.E.

W. H. T. TAMS

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TRANSACTIONS OF THE SOCIETY
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VOL. 13 30TH APRIL, 1958 PART 3

A SHORT SYNOPSIS OF THE BRITISH SCATOPHAGIDAE (DIPTERA)

By J. E. COLLIN, F.R.E.S.

The Scatophagidae (often known as the Cordyluridae) are an interesting family, because while all, or most, of the genera exhibit certain characters of the more specialized Tachinidae and Muscidae, for instance all have a complete longitudinal fissure to second antennal joint, and the majority of the genera have abdominal spiracles situated on the tergites, either all, or most, of the genera also retain certain primitive characters, such as less obviously fused first and second abdominal segments, eight segments in male before the genitalia (seventh quite small and always fused with eighth), both sexes dichoptic, and thoracic squamae vestigial. The possession of so many primitive characters by species in this family has caused Enderlein (1936) to give them the name of Protomuscaria, and there is certainly some justification for his suggestion. Primitive characters, however, are seldom of much use in defining groups within a family, because they have a way of occurring in species of widely different groups, or even families. For instance, eight apparent abdominal segments in the male are to be found in both the Anthomyiidae and some of the Acalyptrate Muscidae, while dichoptic males, and species with vestigial thoracic squamae, occur in the Anthomyiidae.

The Scatophagidae may be known by the following combination of characters: Second antennal joint with distinct and complete longitudinal fissure; frons wide in both sexes, without a pair of crossed bristles on frontalia, but with incurved lower orbital bristles (except in *Hydromyza* which has all bristles very short); no fine hairs beneath tip of scutellum; no indication of a lobe to thoracal squamae, and no strong costal spine at end of first wing vein.

While the majority of the genera have the abdominal spiracles *on* the tergites (at times some distance from sidemargin), they may be very near, or even on the edge of the tergite, or some on the edge, and others in the membrane (*Amaurosoma*), or in membrane extremely close to tergite (*Delina*), or definitely all in the membrane (*Hydromyza*).

The Scatophagidae are not easily distinguished from the Anthomyiidae, or from some of the families of the Acalyptrate Muscidae, but the few British Anthomyids with vestigial thoracic squamae such as *Fucellia*, *Chelisia* and *Chiastochaeta* have cruciate bristles on frontalia, while the Acalyptrates are usually much less chaetophorous, especially seldom with strong bristles on tibiae, and often have no complete longitudinal fissure to second antennal joint, if this fissure should be present, or partially indicated, the vibrissae, or the axillary vein on anal lobe of wing is missing.

This is a family in which the species exhibit a great variety of characters such as one would normally accept as at least of group importance, but when one attempts to make use of them for that purpose, many prove useless. As a consequence while species may often be easily identified, a correct phylogenetic grouping of those species is a matter of great difficulty.

A decision on the relative phylogenetic importance of these characters may often be arrived at by a study of the male genitalia, and Dr. Hackman in a recent (1956) revision of the family, as found in Finland, has given a large number of very useful figures of these organs, and indicated some resemblances, but actually it is only when some of the two different sets of characters (general and genital) show indications of correlation that one can be satisfied of their group significance. It would appear to be because of Dr. Hackman's lack of appreciation of this fact that I differ from him in dividing the genera in his Groups 1, 2, and 3 somewhat differently into two, and not three, Groups. Of the genera in his Group 1, I place *Micropselapha*, *Leptopa*, and *Americina* (*Chylizosoma*) in the Delininae (his Group 3), and feel certain that the same treatment would be correct for at least *Cnemopogon* and *Megaphthalmoides* of his Group 2, two other genera in this group being unknown to me, namely *Gonarcticus* and *Hexamitocera*.

I further agree with him in regard to the close relationship of the genera placed by him in his Groups 5, 6, and 9, but of the genera known to me in his Group 8, I consider that *Acanthocnema* should not be included in his Hydromyzinae because of the different orientation of its orbital bristles.

Dr. Hackman has correctly called attention to the great similarity in the male genitalia of *Delina*, *Micropselapha*, and *Americina* (*Chylizosoma*), but nevertheless placed them in three different groups. In doing so it would appear that he placed too great a value upon the number of sternopleural bristles, and overlooked other apparently more important characters.

Previous students have usually followed Becker (1894) in dividing the family into five subfamilies, but there would appear to be only two natural groups. In the larger of these, the Scatophaginae, most of the genera included by Becker in his Hydromyzinae exhibit a distinctive arrangement of the frontal bristles (as described in couplet 24 (15) in the following table of genera) such as might be considered to indicate another subfamily (or at least tribe), but Becker's type genus *Hydromyza* differs in so many respects from the other Hydromyzinae that its selection as typical was most unfortunate.

The most widely distributed and common species are those of the genus *Scatophaga*, especially *S. stercoraria* which, as its name indicates, is essentially a "dung fly." Other genera are strictly boreal in distribution, and only found in this country in Scotland, where further collecting may yet disclose the presence of some hitherto unrecorded species.

Table of subfamilies

1 (2). Prothoracic episternite (pleural sclerite of prothorax) bare. Six apparent abdominal tergites in male before hypopygium, the first two more or less fused together and easily mistaken for one, sixth tergite fused with seventh and eighth, so as to give the appearance of one tergite. In females seventh and eighth segments (or one of them) all small and of similar structure and chaetotaxy, often all hidden ..... *Delininae*

2 (1). Prothoracic episternite hairy. Seven apparent tergites in male before hypopygium, sixth tergite either quite distinct from seventh and eighth, or only partially fused on left, with the rest of line of fusion fairly conspicuous, seventh tergite very small, only visible on left side, and fused with eighth, or with sixth and eighth. In females, seventh and eighth segments, or one of them, differing considerably in texture and chaetotaxy from sixth, and often structurally modified, never all hidden ..... *Scatophaginae*

Table of genera of Delininae

1 (4). Two almost equally long and strong (antero- and postero-ventral) spurs to hind tibiae. Prealar bristle (anterior supra-alar) present even if small.

2 (3). One or two long dark sternopleural bristles, and a number of long fine hairs. Third antennal joint small and short ..... *Delina* Desv. (*Clidogastra* Mcq.)

3 (2). Three strong dark sternopleural bristles. Third antennal joint large and long, extending to mouthedge ..... *Cnemopogon* Rdi

4 (1). Only one (anteroventral) spur to hind tibiae. Only one sternopleural bristle. No prealar bristle.

5 (6). Vibrissae normal, directed forwards. Jowls devoid of strong bristles ..... *Americina* Mall. (*Chylizosoma* Hend.)

6 (5). A cluster of vibrissae directed downwards, and another cluster of three-four strong bristles on posterior part of jowls below eyes ..... *Leptopa* Zett.

Delina nigrita Fln. The only British species, which is probably widely distributed. I possess specimens from Norfolk, Suffolk and Cambs., and from the counties of Dumbarton, Fife and Inverness in Scotland. Its larvae are said to mine the leaves of *Orchis* and *Platanthera*.

Cnemopogon apicalis Mg. A species somewhat like a *Cordylura* but arista only pubescent, and palpi without a long strong bristle at tip. My records are from Hereford, Gloucester, Hants, Essex, Suffolk and Norfolk. It is to be found among *Phragmites*, and the larvae are said to be predacious, which is very unusual in this subfamily.

Americina vittata Mg. This was formerly considered to be a *Parallelomma*. It was common on the Inverness banks of the river Spey at Grantown in 1937, but I have specimens also from Ross and Perthshire, and English records from Kent and Cambs. In this species the third antennal joint is clear yellow, and the terminal bristle of palpi not as strong as vibrissa, whereas in *paridis* the third antennal joint is dark, and the bristle on palpi stronger and longer than vibrissa. Its larvae mine the leaves of various species of Orchid.

Americina paridis Hering. I have seen a pair only of this species, the male taken by Mr. C. A. Cheetham at Chapel-le-Dale (Yorks.) on 16th May, 1921, and a female by myself at Woodditton Wood (Cambs.) on 29th May, 1908. It should be sought where *Paris quadrifolia* grows, the leaves of which are mined by the larvae.

Leptopa filiformis Zett. The only species in the genus which has been taken by me in Norfolk, Suffolk and Cambs., and by Col. Yerbury in Glamorgan.

Table of genera of Scatophaginae

1 (6). Two almost equally long and strong apical spurs (antero- and postero-ventral) to hind tibiae. Second vein usually setulose above towards tip, but not in *Cordylura pudica*.

2 (5). Only one sternopleural bristle. Arista long haired.

3 (4). Anal vein extended to wingmargin. Three strong upper orbital bristles ..... 1. *Cordylura* Fln.

4 (3). Anal vein not extended to wingmargin. Only two strong upper orbitals in the single British species..... 2. *Parallelomma* Beck.

5 (2). Two or three sternopleural bristles. Arista bare or microscopically pubescent. Four strong scutellar bristles....3. *Gonatherus* Rdi.

6 (1). Only one (anteroventral) spur to hind tibiae, the posteroventral one missing or very short. Second vein usually bare.

7 (12). Only two strong scutellar bristles.

8 (9). More than one sternopleural bristle.....4. *Amaurosoma* Beck.

9 (8). Only one sternopleural bristle.

10 (11). Front femora and tibiae with a double row of very strong spines beneath ..... 5. *Norellisoma* Hend.

11 (10). Front femora and tibiae without spines beneath ..... 6. *Megaphthalma* Beck.

12 (7). Four strong scutellar bristles.

13 (14). Second vein with a few setulae on upper side towards end. Front margin of humeri with a fringe of short strong bristles..... ..... 7. *Gymnomera* Rdi.

14 (13). Second vein bare above at end. Humeri without fringe of bristles in front.

15 (24). Front bristle only of upper frontal bristles pointing forward, the other two reclinate, or all three turned outward.

16 (19). Front tibiae beneath with a double row of very small, closely set, black spines. Palpi shorter and somewhat spatulate. Only one supra-alar bristle.

17 (18). Front orbital bristle pointing forwards, other two more or less outwards ..... 8. *Acanthocnema* Beck.

18 (17). All three orbitals long and curved outwards..9. *Clinoceroides* Hend.

19 (16). Front tibiae with rather long fine hairs beneath, and no minute black spines. Palpi long and slender. Two supra-alar bristles.

20 (21). Front tibiae with a distinct anteroventral spinose bristle before, and another at, tip..... 10. *Ceratinostoma* Mde.

21 (20). Front tibiae at least without anteroventral spine before tip, usually also without one at tip.

22 (23). Male abdomen clothed with fine, long, outstanding hairs, not bristle-like even on hindmargins of tergites. Head in profile with upper part of occiput more rounded, thus making a more even curve with vertex and frons..... 11. *Scatophaga* Mg.

23 (22). Male abdominal tergites with short adpressed hairs, except for longer hindmarginal bristles. Head in profile with upper part of occiput flatter, consequently less rounded at junction with vertex ..... 12. *Coniosternum* Beck.

24 (15). Two front bristles of upper frontals pointing forwards, or (*Hydromyza*) three *very* short and small bristles pointing forwards.

25 (26). Two sternopleural bristles, the front one shorter and finer, other pubescence on sternopleura short and pale. Third antennal joint pointed at tip above ..... 13. *Chaetosa* Coq.

26 (25). Only one sternopleural.

27 (28). All bristles on body and legs very short, three very small proclimate frontal bristles ..... 14. *Hydromyza* Fln.

28 (27). Bristles of normal length, posterior bristle of three upper frontal bristles pointing backwards.

29 (30). Wings with rounded brown spots on veins, often associated with adventitious veinlets. Pteropleura hairy .... 15. *Ernoneura* Beck.

30 (29). Wings without brown spots or veinlets. Pteropleura bare.

31 (34). Front tibiae with an anteroventral row of closely placed short spines.

32 (33). Male hypopygium with a tuft of very long yellow bristles on each side. Front femora with black spines beneath, or at least (in female) with short black bristles beneath ..... 16. *Pogonota* Zett.

33 (32). Male hypopygium without tuft. Front femora with only fine hairs beneath ..... 17. *Microprosopa* Beck.

34 (31). Front tibiae without spines beneath.

35 (36). Distinct propleural and stigmatical bristles above front coxae. A second short but distinct supra-alar (prealar) bristle..... ..... 18. *Trichopalpus* Rdi.

36 (35). Usually only a yellowish propleural bristle, and no distinct stigmatical bristle. Prealar bristle absent .... 19. *Spathiophora* Rdi.

1. *Cordylura* Fallén

Table of species

1 (14). Scutellum with four strong bristles.

2 (13). Palpi dark.

3 (8). All tibiae equally yellow.

4 (7). Tarsi darkened beneath at base of last four joints. Second vein setulose above towards its end.

5 (6). Male genital paralobes broader, very deeply split longitudinally, and with rectangular upper basal corner. Arista longer haired. No distinct prescutellar acrostichals ..... *pubera* Fln.

6 (5). Male genital paralobes more ovate with only a short cleft at tip, and a rounded upper basal corner (fig. 1). Arista shorter haired. A distinct pair of prescutellar acrostichals.....*aemula* sp.n.

7 (4). Tarsi not darkened at base of joints beneath. Third antennal joint with upcurved pointed tip. Second vein bare above..*pudica* Mg.

8 (3). Hind tibiae brownish, or all tibiae dark. Second vein setulose above towards tip.

9 (10). Only hind tibiae brownish. Thorax dusted. Femora yellowish at extreme tip. Only 1-2 small setae on second vein..*rufimana* Mg.

10 (9). All tibiae dark. Second vein with more numerous setae.

11 (12). Larger species (8-9 mm.), more shining, and without acrostichals. Third antennal joint with a long bristle on outer side below base of arista ..... *ciliata* Mg.

12 (11). Smaller (5 mm.) somewhat dusted species, with only a few small acrostichals, and no bristle on third antennal joint....*atrata* Zett.

13 (2). Palpi yellow. All tibiae and tarsi yellow, or only hind tarsi yellowish-brown ..... *similis* Siebke.

14 (1). Scutellum with only two strong bristles.

15 (16). Larger species (8-9 mm.) with yellow tibiae..... ..... *impudica* Rdi. (*umbrosa* Lw.)

16 (15). Smaller species (6 mm.) with dark tibiae....*picipes* Mg. (*biseta* Lw.)

Cordylura pubera F. is a widespread, but not common species, which I can record from Hants, Surrey, Oxford and Cambs. in England, Brecknock in Wales, and Inverness-shire in Scotland.

Cordylura aemula sp. n. A species closely resembling *pubera*, but with very different male genitalia.

♂. Compared with *pubera*: Arista rather less densely, and shorter, haired. Thorax slightly more dusted greyish; prescutellar acrostichals stonger and more distinct. Abdomen slightly more dusted greyish, in addition to fine pale hairs being present about base and at sides of first three tergites, they

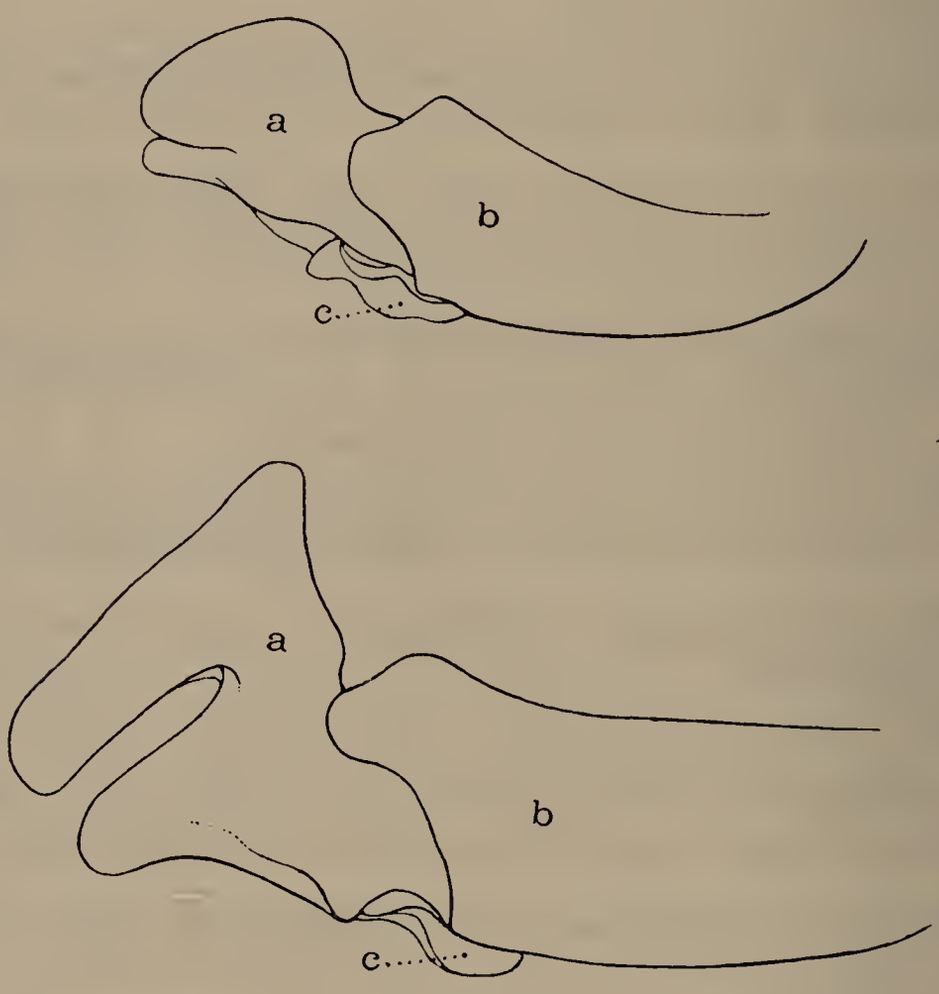

Fig. 1. Upper fig., *Cordylura aemula* sp.n. Lower fig., *Cordylura pubera* F. Outline of ninth tergite and paralobe, viewed from left.
(a) paralobe, (b) ninth tergite, (c) mesolobe.

are also present at sides of fourth and fifth tergites, and on lobes of fifth sternite; some pale hairs also on hypopygium. Front femora with more numerous pale hairs; front tarsi rather shorter, and last joint not so black; middle tibiae with mainly pale posteroventral hairs; hind femora rather stouter and with longer pale hairs beneath; hind tibiae less hairy beneath, bearing only a few outstanding pale bristle hairs posteroventrally, and only one anteroventral bristle (towards tip). Male genital paralobes very different in shape (fig. 1).

♀. Less easily distinguished from females of *pubera*, but differing as in male in having shorter haired arista, distinct prescutellar acrostichals, and shorter tarsi.

Length about 8-9 mm.

Described from specimens taken at Barton Mills (Suffolk) on 3.vi.1935, some having been taken there previously in May 1909. I have also found it at Horning Ferry (Norfolk).

C. pudica Mg. Not uncommon in Scotland (various localities in Inverness-shire), but also found in Suffolk and Warwickshire.

C. rufimana Mg. All my specimens are from Scotland (Inverness-shire).

C. ciliata Mg. All my records are from the south: Sussex, Hants, Hereford, Gloucester, Cambs., Suffolk and Norfolk, but I have no doubt that it has a still wider distribution.

C. atrata Zett. Another northern species with records from Scotland only.

C. similis Siebke. This is a very little known species first discovered in this country by Col. Yerbury on the banks of the Spey at Aviemore. Under his guidance I took a series of specimens at the same spot in 1913, and visits there more than twenty years later have proved that it still occurs in this locality.

The species was originally described from the male only, taken at Ostendalen, Norway, NE. of Oslo, at between 61° and 62° N. latitude, and is obviously very closely related to the more arctic *C. picticornis* Lw. described from the female only, taken in "Siberia," and since recorded from northern Finland between 66° and 70° N. latitude, while it has also been recorded from arctic North America.

A comparison of my specimens of *similis* from Aviemore (slightly more than 57° N. latitude) with specimens of *picticornis* from Alaska, makes it appear advisable to retain the name of *similis* for them, and there may be some question in regard to the identity of the specimens found in Finland and identified as *picticornis* by Dr. Hackman (1956).

The Scottish specimens are less strongly bristled than in *picticornis* from Alaska. Notably all tibiae with much shorter and less outstanding fine setulae, especially those beneath; in *picticornis* these setulae are decidedly longer than the tibiae are thick. All the femora of *similis* are of the same colour *in both sexes*, i.e. all dark except narrowly at tip, but while those of *male picticornis* are similarly coloured, those of the *female* are all yellow except front femora above, as described for the female by Loew, and as in the female from Alaska.

C. impudica Rdi. This is the *C. umbrosa* Lw. of the British List. It is not at all an uncommon species in the south.

C. picipes Mg. (*biseta* Lw.). An uncommon species known to me only from Cambs., Herefordshire and Suffolk.

2. *Parallelomma* Becker

P. albipes Fln. This is a common species throughout Britain up to Loch Maree in Scotland, and is very variable in colour. There is only one, instead of the usual two, reclinate upper orbital bristles on frons. The larvae mine the leaves of various Liliaceae.

3. *Gonatherus* Rdi.

G. planiceps Fln. Only found high up on the hills in Scotland, where Dr. F. W. Edwards first found it, in Perthshire, in 1932. Two years later I took specimens near the summit of the Aviemore-Braemar Pass.

4. *Amaurosoma* Becker

Table of species

1 (4). All femora yellow, or at most only front femors with a darkened streak above.

2 (3). Thorax partly shining, pleurae with shining patches..... ..... *brevifrons* Zett.

3 (2). Thorax and pleurae all dusted.....*flavipes* Mg.

4 (1). Femora largely or entirely dark.

5 (6). Front femora without anteroventral black bristles....*inerme* Beck.

6 (5). Front femora with at least a few black anteroventral bristles, often a large patch of such bristles.

7 (10). Front femora with many (at least 9-10) anteroventral black bristles.

8 (9). Male: Front tibiae without a bristle behind close to the pair of bristles above (though present in female) and four posterior tibiae with an anteroventral bristle; second joint of arista rather long; crossveins more approximated. Female: Antennae larger; a more or less strong black bristle on posterior part of jowls below eyes; crossveins more approximated; usually a posteroventral bristle to hind femora at middle, and an anteroventral bristle to hind tibiae.....*tibiella* Zett.

9 (8). Male: Front tibiae with a bristle behind close to the pair of bristles above, and no anteroventral to four posterior tibiae; second joint of arista short; crossveins not so approximated. Female: Antennae smaller; no strong bristle on jowls behind; crossveins less approximated; no posteroventral bristle to hind femora at middle; and often no anteroventral bristle to hind tibiae....*fasciatum* Mg.

10 (7). Front femora with only 5-6 anteroventral black bristles, three being longer than others.....*armillatum* Zett.

A. brevifrons Zett. is a Scottish species (Edinburgh and Inverness-shire), but I possess a female taken by Mr. J. W. Saunt at Stoke (Warwickshire).

A. flavipes Mg. has been bred from seed-heads of Timothy-grass. It appears to be local in distribution. My records are from Suffolk, Essex and Oxford.

A. inerme Beck. Apparently widely distributed with specimens from Merioneth, Hants, Suffolk and Inverness-shire. It is said to occur especially on *Calamagrostis*.

A. tibiella Zett., and *A. fasciatum* Mg. These two species have hitherto been distinguished by the darker colour of the femora in the former, *fasciatum* having them yellowish about base and tip, but I do not find this to be at all reliable, so have proposed other characters. Both species are common and widespread. Dr. W. Hackman (1956) has expressed the belief that *nigripes* Zett. and *tibiella* Zett. are merely varieties of one species for which he uses the name *nigripes* Zett. He gave a figure of the male genitalia of a type from Zetterstedt's Collection, but as the genitalia of our British *tibiella* do not entirely agree with this figure I am retaining the use of that name for our British species.

A. armillatum Zett. Here again the colour of hind femora appear to vary, but the smaller number of black bristles beneath front femora is distinctive of the species which I can record from Cambs. and Suffolk in England, and Dumbarton in Scotland. On the Continent it is said to be a pest on *Phleum*.

5. *Norellisoma* Hendel

The genus *Norellia* having been founded on one species only (*pseudonarcissi—spinipes* Mg.) which is generically distinct from our British species, Hendel's name of *Norellisoma* must take the place of *Norellia* Desv. in our British List.

Table of species

1 (2). Arista short plumose. Larger species. Lobes of male fifth abdominal sternite long, curved and flattened with tiny black spines along inner margin ..... *spinimanum* Fln.

2 (1). Arista only pubescent. Smaller species (4-5 mm.).

3 (4). Abdomen dull grey like thorax. Each lobe to fifth sternite in male ending in a bluntly bilobed tip..... .....*flavicorne* Mg. (*liturata* Beck. *nec.* Mg.)

4 (3). Abdomen more shining (expecially at sides) than thorax. Each lobe of fifth sternite in male ending in a simple blunt point..... .....*lituratum* Mg. (*spinigera* Zett.)

(No other species has been correctly recorded as British.)

N. spinimanum Fln. is not an uncommon species, the larvae of which are said to live in the stems of *Rumex*.

N. flavicorne Mg. may be swept from *Spiraea*.

N. lituratum Mg. has been frequently found in Scotland, but I have British records from Hants, Hereford and Warwick.

This last species was attributed by Meigen to Wiedemann, and the specimens in Wiedemann's Collection at Vienna must be the types (not those at Paris as accepted by Becker in 1902), also Meigen's description applies far better to the Vienna specimens (the species we have known as *spinigera* Zett.). *N. flavicorne* on the other hand was described from specimens in Baumhauer's Collection, and though according to Becker (1902) the single male in Meigen's Collection (probably that stated by Meigen to be "auch einmal hier gefangen") is a specimen of *spinigera* Zett., the *description* given by Meigen does *not* agree with this specimen, but *does* agree with the species Becker called *liturata*. The two species therefore should in future be known under the two names given in the above table.

6. *Megaphthalma* Becker

We have only one British species, *M. pallida* Fln., which is widely distributed in wooded districts.

7. *Gymnomera* Rondani

Again only one British species, *G. tarsea* Fln., recorded from various localities in Scotland, but also found by me in the Norfolk Broads in 1930. *G. dorsata* Zett. was incorrectly recorded as British by Dr. Meade upon a specimen of *Leptopa filiformis* Zett.

8. *Acanthocnema* Becker

A. nigrimana Zett. is a brown species with legs mainly yellow, and front of frons yellow, third antennal joint yellow in male but darkened towards tip in female; hairs on jowls, front coxae, and proboscis longer in male than in female. Like the next species it remains a rarity in this country, the only specimens additional to those already recorded being a female taken by myself at Llangrwyney (Brecknock) in August 1910, and another female taken by Dr. C. G. Lamb in the Island of Lewis in July 1914.

9. *Clinoceroides* Hendel

C. glaucescens Lw. is a dark, glaucous insect with dark legs and front of frons, and darkened wings, third antennal joint dark in both sexes. It stood in Verrall's List, by a *lapsus*, as *Acanthocnema glauca* Lw., and was redescribed by Ringdahl in 1936 as *A. nigripes* sp. n. It still remains a rarity, the only additional specimens known to me being a pair taken by myself at Bickleigh (Devon) in May 1914, and a male by Mr. H. Britten in the Goyt Valley (Cheshire) in April 1926.

10. *Ceratinostoma* Meade

The one species, *C. osteriorum* Hal., is essentially a sea-coast species occurring from Inverness and the Isle of Arran down to the south coast of England.

11. *Scatophaga* Meigen

Table of species

1 (20). Arista long haired.

2 (5). Area between base of abdomen (beneath) and hind coxae not divided vertically by a membraneous strip. Fourth and fifth veins converging towards tip.

3 (4). Large species, with (in male) large broad yellowish-brown wings, front femora entirely yellow, middle tibiae with two antero- and postero-dorsal bristles..... *scybalaria* L.

4 (3). Smaller, and with normal sized wings in male, front femora with a dark posteroventral streak, and middle tibiae with only one antero-, and one postero-dorsal, bristle..... ..... *scybalaria* var. *anomala*, n.

5 (2). Area between base of abdomen and hind coxae with a vertical membraneous strip widening out above and below. Fourth and fifth veins parallel.

6 (17). Pteropleurae bare. No bristle beneath middle tibiae.

7 (10). Fifth abdominal sternite of male with a pair of small projecting median lobes, not merely with an indentation at middle of hind-margin. Seventh abdominal segment of female shining. Hind femora of male without, of female with, an anterodorsal row of distinct bristles.

8 (9). Crossveins not infuscated. Humeri similar in colour and dusting to rest of thorax ..... *taeniopa* Rdi.

9 (8). Crossveins of wings distinctly though narrowly infuscated. Humeri yellow in contrast to grey-dusted thorax..... *suilla* F.

10 (7). Fifth abdominal sternite of male without projecting lobes. Seventh abdominal segment of female dull like others. Hind femora in both sexes with an anterodorsal row of distinct bristles.

11 (12). Male abdomen entirely yellow, and yellow haired. Fifth sternite of male with tiny black spines on hindmargin near median indentation. Female characters uncertain. The first species of this group to appear in the spring..... *analis* Mg.

12 (11). Male abdomen not entirely yellow (at least hindmargins of tergites darkened), and some dark hairs mixed with yellow ones towards end of abdomen. Fifth male sternite with only fine hairs near median indentation.

13 (16). Front femora absolutely immaculate.

14 (15). More yellowish-grey species with humeri and scutellum more extensively yellow. Abdomen often only darkened about base, or on hindmargins of tergites ..... *lutaria* F.

15 (14). More blackish-grey species with upper surface of humeri the same colour as rest of thorax. Abdomen more extensively greyish.... ..... *lutaria* var. *inquinata* Mg.

16 (13). Front femora with darkened streak above, sometimes only faint.. ..... *lutaria* var. *maculipes* Zett.

17 (6). Pteropleurae hairy. Both antero- and postero-ventral bristles beneath middle tibiae.

18 (19). Male abdomen without dark hairs except on hypopygium. Usually large reddish-yellow haired species ..... *stercoraria* L.

19 (18). Male abdomen with dark hairs mixed with pale ones. Smaller grey-haired species ..... *stercoraria* var. *merdaria*, F.

20 (1). Arista bare or microscopically pubescent....(Subg. *Scatina* Desv.)

21 (26). Pteropleurae bare. Both crossveins conspicuously clouded. Acrostichals on thorax fine and few in number.

22 (25). Fifth sternite of male abdomen with small projecting median lobes. Humeri same colour as thorax. Crossveins not very broadly infuscated.

23 (24). Front coxae mainly pale, and four posterior femora entirely pale. Both a bristle beneath, and a posteroventral bristle, to middle tibiae, and an anteroventral bristle to hind tibiae. . . . *squalida* Mg.

24 (23). Front coxae dark, four posterior femora with a broad dark ring about middle. Only a posteroventral bristle to middle, and no anteroventral bristle to hind tibiae. (Male only). . . . . *varipes* Holmg.

25 (22). Fifth sternite of male abdomen with large side lobes. Humeri yellowish at least below. Crossveins broadly infuscated. Female with shorter pleural hairs than in *squalida*, and usually at least one distinct propleural bristle. . . . . *pictipennis* Oldenb.

26 (21). Pteropleurae hairy. Crossveins not clouded. Acrostichals strong and numerous, biserial with the rows close together.

27 (28). Hind tibiae of male with 3-4 pairs of spinose bristles above, and at least one such bristle anteroventrally, other pubescence above not particularly long. Female with a distinct posterodorsal bristle near tip of hind femora, and rows of acrostichals more equally distant from each other, and from dorsocentrals. . . . . *litorea* Fln.

28 (27). Hind tibiae of male above with at most only 1-2 pairs of very long fine bristles on apical half, otherwise with *particularly long* outstanding hairs even anteroventrally. Female with hind tibiae normally spinose, hind femora without a distinct posteroventral bristle near tip, and rows of acrostichals closer together than distant from dorsocentrals. . . . . *calida* Hal. (*villipes* Zett.)

S. scybalaria L. appears to be an uncommon species. Col. Yerbury found it in Ireland (Waterville and Loo Bridge), and R. C. Bradley used to take it in Sutton Park (Warwick). Until 1952, I had taken only one specimen (a female) in the New Forest, but in that year, when collecting with my friend Mr. E. A. Fonseca in the Forest at Denny Bog, we found it in large numbers on cow-dung.

S. scybalaria var. *anomala* var. n. An aberrant male of *scybalaria* was taken by Col. Yerbury at Nethy Bridge (Inverness) on 15th June 1900. It is a greyer insect with humeri and prothorax grey, like rest of thorax; abdomen dull grey except on pre-hypopygial segments and genitalia, pubescence not so bright yellow; front femora with a dark posterodorsal streak; middle tibiae with only one antero- and one postero-dorsal bristle; wings normal in size and not so intensely yellowish-brown. Length about 7 mm.

It superficially resembles a male of *S. taeniopa*, but the male genitalia of that species are quite different. The fifth sternite for instance (a character always visible) has in that species narrow, strongly projecting, median lobes, while in *scybalaria* they are mere rounded undulations of the hindmargin.

S. taeniopa Rdi. This species varies in the femoral dark markings, these may be confined to the front femora only (*S. ordinata* Beck., which is a synonym), or present on the four anterior, or on all, femora. Smaller specimens are usually the darker. It is not uncommon in Scotland, and I have taken it in Yorkshire, but have no records further south than Nottingham.

S. suilla F. is a common and widespread species. A small slender weakly bristled form (*scatomyzoides* Zett.) occurs in Scotland, in company with the typical form, but apparently is not specifically distinct.

S. analis Mg. though closely allied to the next species does exhibit small differences in the male genitalia. It is also not so common or so widely distributed. An undoubted male of this species was returned to me by Becker as *S. inquinata* Mg., but he must have overlooked its entirely pale haired abdomen, a character stated by him as distinguishing *analis* from *inquinata*.

S. lutaria F. This species, and the two hitherto included in the British List as *inquinata* Mg., and *maculipes* Zett., have the same chaetotaxy of legs, and quite similar male genitalia, they differ only in slight colour characters, and must surely be only forms of one variable species. I have taken a male *maculipes in cop.* with a female which could only pass as *inquinata*. All three forms are common, and occur together.

S. stercoraria L. This very common species never has a distinct postero-dorsal bristle near tip of hind femora in either of its two forms found in Britain, nor are these femora more than narrowly yellowish at tip.

S. squalida Mg. is another common and easily recognized species. One may find aberrant males of this species with the short abdominal pubescence of a female, these will be found on dissection to be intersexes.

S. furcata Say of N. America is said to be the same species as our *squalida*.

S. varipes Holmg. A remarkable male taken by me on 3rd of July 1938 at Bettyhill on the north coast of Sutherland (Scotland), with dark front coxae, and distinctive chaetotaxy of the four posterior tibiae, may prove to be the true *varipes* of Holmgren. It appears to agree very well with his description, and differs considerably from the northern form of *squalida* from Spitzbergen and Jan Mayen which I thought at one time might be *varipes*. A much longer series of specimens from North Scotland must be obtained before the problem of its identity can be considered solved.

S. pictipennis Oldenb. This is the "*S. maculipennis* Beck. (*in litt.*)" of Verrall's List of British Diptera 1901. A male taken by Verrall at Rannoch (Perthshire) in 1870 was returned to me so named by Becker, who however apparently never published a description. Ringdahl's description of *S. maculipennis* in 1936 applies to the same species, which however appears to have been described by Oldenberg in 1923 as *S. pictipennis*. A second male was taken by Dr. F. W. Edwards at Aviemore (Inverness) in May 1934, and I took four females the same year in the same district, where Mr. P. Harwood has also found it sheltering in Juniper bushes in September, and even November.

S. litorea Fln. is a common, but variable, species widely distributed round our coasts. It has been recorded, quite incorrectly, as the type of the genus *Scatomyza* of Fallén, but was not one of the originally included species.

S. calida Hal. According to specimens in Haliday's Collection in Dublin his *S. calida*, and *S. rudis*, are both specimens of *S. villipes* Zett. *S. calida* being the form with entirely yellow legs (by the word "feet" in his description Haliday must have meant "legs"), and *rudis* the form with femora darkened. In addition to varying in the colour of the legs, this species also varies in the length and density of the fine hairs on male legs and abdomen. It is another sea-coast species which has been taken on the north coast of Scotland, in Wales (Glamorgan), and in the Scilly Isles.

This species is also almost certainly that referred to by Séguy (1934) as *S. nigricornis* Desv. (*rufiventris* Vill.), but cannot possibly be Desvoidy's *nigricornis* (1830) because that species (described from a single specimen with sex not mentioned) was placed by Desvoidy in a genus "*Scatophaga* Latr. Fabr." *restricted to those species with* "chetum plumosulum," while species of *Scatophaga* having a bare arista "chetum nudum" (as in Séguy's *S. nigricornis*) were placed by Desvoidy in a distinct genus "*Scatina*." Apart from this fact, Desvoidy described his *nigricornis* as having "Corps de consistance molle, et d'un jaune pâle," and as it is certain that throughout Desvoidy's work the term "corps" included both thorax and abdomen, this would be incorrect if the species before him had been *calida* Hal.

NOTE: I would here call attention to the fact that *Scatophaga villosiventris* Ringd. (1937) (*vulpina* Ringd. *nec* Coq.), is almost certainly a synonym of *Scatophaga lanata* Lundb. (1904), according to a specimen of the latter presented to me by its describer.

12. *Coniosternum* Becker

This genus is closely allied to *Scatophaga* and was not properly distinguished from that genus by Becker. One species *decipiens* Hal. (of which *Scatophaga dalmatica* Beck. is a synonym) has always been placed in *Scatophaga*, and Malloch did not consider the two genera distinct, but the two British species *decipiens* Hal. and *obscurum* Fln. obviously belong to such a very distinct group by the shape of the head, chaetotaxy of abdomen, and especially by the structure of the male genitalia, that they may well be generically separated from *Scatophaga*.

C. decipiens Hal. is a larger species than *obscurum* with stronger thoracic bristles, especially with two distinct intra-alar bristles, which are absent or only front one developed in *obscurum*, a posthumeral as well as a presutural bristle, and two almost equally strong humeral bristles. The carinate mesolobe of male genitalia narrowing to a slender incurved tip, is the same in both species. *C. decipiens*, described from an Irish specimen, appears in England to be limited to occurrence in the south and south-east.

C. obscurum Fln. is at present only known from Scotland.

13. *Chaetosa* Coquillett

C. punctipes Mg. is a common species which I can record from Kent, Hants, Hereford, Norfolk, Suffolk, Essex, Cambs. in England; Inverness and Sutherland in Scotland; and Kerry in Ireland. Its larvae live in various Gramineae.

14. *Hydromyza* Fallén

H. livens F. is to be found on Water-lily leaves, in the stems of which the larvae feed.

15. *Ernoneura* Becker

E. argus Zett. is a rare species found in Scotland only, and first recorded as British by Dr. D. Sharp in 1910 from a single specimen taken at Loch Garten (Inverness), while I caught a pair at Loch Einich in the same district on 30th June 1933.

16. *Pogonota* Zetterstedt

P. hircus Zett. Another northern insect found about moorland pools. Ringdahl (1936) used for this species the name of *barbata* Zett., which was described a page prior to *hircus* from an immature specimen such as would seldom be found. Under these circumstances it cannot be claimed that "other things are equal," and the page precedence should be ignored.

17. *Microprosopa* Becker

M. pallicauda Zett. The *M. haemorrhoidalis* Mg. of our List is certainly not that species but *pallicauda* Zett., of which Ringdahl (1936) figured the male genitalia. It was indeed recorded under that name by Grimshaw in 1900 (Ann. Scot. Nat. Hist.), and is not uncommon in the Spey Valley (Inverness-shire). True *M. haemorrhoidalis* has not yet been found in Britain.

NOTE: The record of *M. heteromyzina* Zett. by Meade as a species of *Scatophaga* is almost certainly incorrect. this species being known at present only from Lapland. There is no specimen in Meade's Collection.

18. *Trichopalpus* Rondani

T. fraternus Fln. can be recorded from Hants, Warwick, Norfolk, Suffolk, Essex and Cambs., and will certainly be found elsewhere. Mr. Wallace Pugh has recently found it in Wales.

19. *Spathiophora* Rondani

S. hydromyzina Fln. This species is undoubtedly very variable in the colour of its legs, and *fascipes* Beck. is only a pale-legged variety of which specimens have been taken by me at Aldborough (Suffolk) in the same place as typical *hydromyzina*. It has been found in various other localities in England, as well as in Scotland, Wales and Ireland. In 1918 I bred specimens from larvae feeding on Cabbage-roots attacked by the Club-root fungus.

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